## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beard et al (7,302,316) in view of Duggan et al (7,343,232).

Regarding applicant claim 1-14, 44, Beard discloses a **method for controlling an unmanned vehicle with a state machine on said UV comprising** (col.2, lines 40-67, "a control system for autonomously controlling an unmanned aerial vehicle")

**entering a state of said state machine** (col. 3, line 11-23, "autopilot control system includes executable instructions on the on-plane control system that are executable by the processor");

**receiving an input on said UV** (col.3, line 12-20, "executable instructions are configured to implement a method for estimating the attitude of the UAV, includes sampling the state variables that are provided in part by the accelerometers, rate gyroscopes");

**evaluating a condition of a rule corresponding to said state using said input; performing at least one action corresponding to said rule based on a result of said evaluating; and modifying said state machine** (col.3, line 10-25, "once the state variables are sampled they are processed through a fixed gain Kalman Filter,

whereupon a new state variable estimates are calculated. The new state variable estimates are then stored in the on-plane memory")**.**

Although Beard does not disclose "**reconfiguring said state machine as a new state machine**," Duggan discloses a system for controlling unmanned vehicles including specialized autopilot system components and methods employed to ensure smooth transitions between control modes (abstract); Variable autonomy control system architecture… supports selectable levels of control autonomy from fully autonomous control to simplified manual flight control modes for enhanced real-time control (col. 5, lines 19-25); Beard further discloses the reasons for either type of operation (col. 5, lines 25-col. 6, line-6).

Duggan discloses the need for highly trained operator for a fully manual control or the exclusion of a human-in-the-loop for a fully autonomous control vehicle. This control design exploits existing flight control technologies to arrive at an ideal balance between the two above described control philosophies (col.5, lines 30-35). Duggan further suggests that this will allow the operator to manage a plurality of autonomous vehicles (col.58, lines 15-30)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the state machine of Beard with the Variable autonomy control system architecture of Duggan in order to modify and reconfigure the state machine into a new state machine motivated by the need to balance the controls and the flexibility to allow the operator to oversee multiple autonomous vehicles.

Regarding applicant claims 15-22, 33-43, 45, Beard discloses a method for **managing a first participant in a network of unmanned vehicles and ground stations wherein said network includes at least one other participant comprising** (abstract, col.2, lines 40-67, "a control system for autonomously controlling an unmanned aerial vehicle… a first set of sensors… a second set of sensors… furthermore, the on-plane control system may also have a global positioning system" col. 3, line 4-10, "ground station also includes an RC controller in electronic communication with the processor. The RC controller may be used for manual control of the UAV if desired"):

Beard discloses **maintaining first state information about said first participant** as described above; but is silent concerning **transmitting an update of said first state information to said at least one other participant; maintaining second state information about said at least one other participant; and receiving an update of said second state information from said at least one other participant.**

Duggan further suggests that this will allow the operator to manage a plurality of autonomous vehicles. Duggan gives an example of a sample mission. "Three UAVs are simultaneously controlled by a single operator from a ground station… simulating a search and destroy mission" (col.58, lines 15-30). Duggan describes the plurality of UAVs communicating with the ground control station (col. 46, lines 52-67)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the state machine of Beard with the Variable autonomy control

system architecture of Duggan in order to modify and reconfigure the state machine into a new state machine motivated by the need to balance the controls and the flexibility to allow the operator to oversee multiple autonomous vehicles.

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the state information of Beard with the collaboration approach of Duggan in order to provide a well integrated control and guidance system to allow for people with minimal aviation experience or manual skill to operate the vehicle (col. 1, lines 25-38).

Regarding applicant claims 23-32, Beard discloses a **system for controlling an unmanned vehicle with a state machine on said UV comprising** (col.2, line 40-67)**:**

**a sensor mounted on said UV** (col. 2, line 45-50, "different sensors in electronic communication with the processor")**;**

**a controller module mounted on said UV and coupled to said sensor** (col. 2, line 45, "on-plane control system also includes a processor and memory in electronic communication with the processor")**;**

**a junction mounted on said UV coupled to said sensor and said controller module** (col. 2, line 45, "on-plane control system")**; and**

**a command unit mounted on said UV and coupled to said junction, wherein: said command unit is configured to control said UV using said controller module based on information from said sensor** (col. 4, lines 45-60, "autopilot system 100 provides flight control of a UAV 101")**.**

Although Beard does not use the term junction, it would have been obvious to one of ordinary skill in the art to equate the on-plane control system of Beard to the applicant's junction since it serves the same function of communicating between the sensors and controller.

### *Response to Arguments*

Applicant's arguments have been fully considered and are persuasive. Therefore, the rejection based on Beard et al (7,302,316) in view of Dapp et al (7,415,331) has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Beard et al (7,302,316) in view of Duggan et al (7,343,232) under 35 U.S.C. 103(a).

### *Conclusion*

Applicant's amendment on 10/29/2009 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WAE LOUIE whose telephone number is (571)272-5195. The examiner can normally be reached on M-F 0700-1530.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/W. L./
Examiner, Art Unit 3661

/Thomas G. Black/

Supervisory Patent Examiner, Art Unit 3661